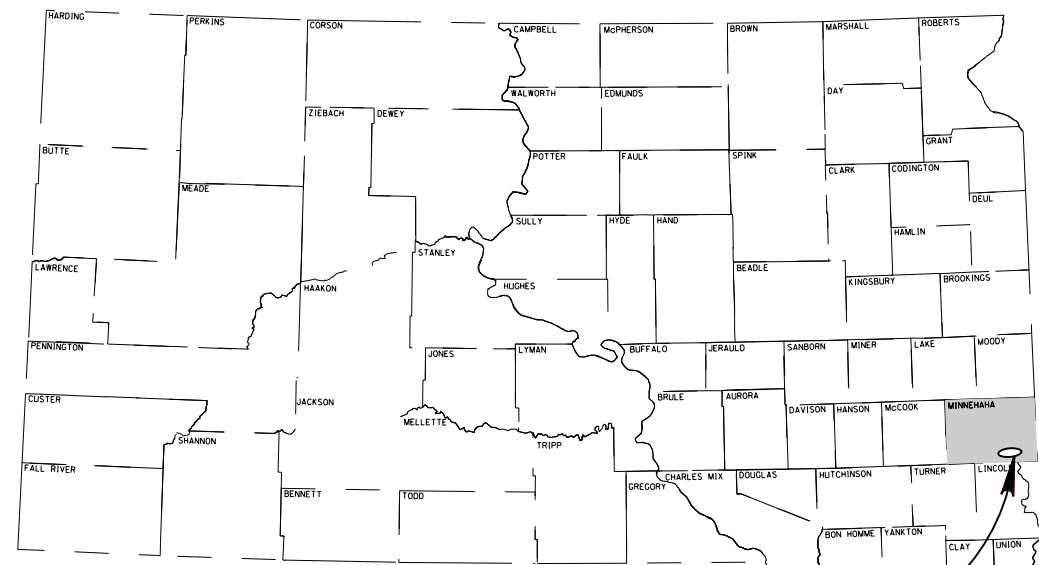




STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT NH 2115(45)87
SD 115 (CLIFF AVE)
MINNEHAHA COUNTY

TRAFFIC SIGNAL EQUIPMENT PROCUREMENT

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 2115(45)87	G1	G7

INDEX OF SHEETS

G1	General Layout w/Index
G2	General Notes
G3-G5	Signal Layout Plan Sheets
G6-G7	Details

PROJECT

PCN 03PU

BEGIN NH 2115(45)87
CLIFF AVE.
STATION 100+35.82
SD Highway 115 & E. Benson Road

This Highway is a "CONTROL OF ACCESS" Highway as adopted by the South Dakota Transportation Commission. Access points to be limited to those shown on the construction plans except any additional that are required as a result of Right-Of-Way acquisition.

DESIGN DESIGNATION

ADT (2009)	17850
ADT (2029)	31475
DHV	3465
D	50%
T DHV	2.0%
T ADT	4.3%
V	45 MPH

STORM WATER PERMIT

Major stream: Big Sioux Diversion
Area Disturbed: 21.4 Acres
Total Project Area: 28.4 Acres
Approx. Begin Lat/Long 43.5873, -96.7112

SCALES

URBAN

PLAN 1 INCH = 40 FT.

PROFILE HORIZONTAL: 1 INCH = 40 FT.
VERTICAL: 1 INCH = 10 FT.

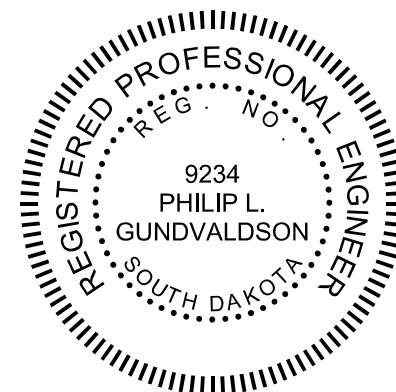
CROSS SECTIONS HORIZONTAL: 1 INCH = 20 FT.
VERTICAL: 1 INCH = 10 FT.

GROSS LENGTH	5,527.65 FEET	1.047 MILES
LENGTH OF EXCEPTIONS	0 FEET	0 MILES
NET LENGTH	5,527.65 FEET	1.047 MILES

PLANS BY:



431 N. PHILLIPS AVENUE, SUITE 400
SIOUX FALLS, SD 57104
(605) 334-4499 FAX (605) 338-6124



LETTING NUMBER

SECTION L ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
635E2050	Signal Pole with 50' Mast Arm	1	Each
635E2055	Signal Pole with 55' Mast Arm	2	Each
635E2140	Signal Pole with 40' Mast Arm and Luminaire Arm	1	Each
635E2145	Signal Pole with 45' Mast Arm and Luminaire Arm	1	Each
635E2150	Signal Pole with 50' Mast Arm and Luminaire Arm	3	Each
635E2155	Signal Pole with 55' Mast Arm and Luminaire Arm	1	Each
635E4030	3 Section Vehicle Signal Head	28	Each
635E4040	4 Section Vehicle Signal Head	12	Each
635E4080	3 Section Directional Vehicle Signal Head	3	Each
635E4100	5 Section Directional Vehicle Signal Head	5	Each
635E5430	Traffic Signal Controller	3	Each
635E9924	24 Strand Fiber Optic Cable	5655	Ft

SHOP DRAWING AND CATALOG CUTS SUBMITTALS

The Contractor shall submit shop drawings and catalog cuts for all traffic signal equipment in accordance with Section 985 of the Standard Specifications or in Adobe PDF format to HR Green, Inc. at 431 N. Phillips Avenue, Sioux Falls, SD 57104. After review, corrections (if necessary), and approval by HR Green, Inc., the SDDOT will review the submittals and grant authorization for fabrication. Adobe PDF submittals shall be sent to the following email addresses:

Pgundvaldson@hrgreen.com
Afagerness@hrgreen.com

BREAKAWAY BASES

A statement is required, signed by a Professional Engineer registered in the State of South Dakota, certifying that the breakaway base devices meet the design requirements, including breakaway and structural adequacy, of the "AASHTO Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals". The physical testing procedures outlined in Section 8 of the Fifth Edition of the Aluminum Association's "Specifications for Aluminum Structures" may be used to establish service limits for structural adequacy certification of aluminum breakaway transformer bases and frangible couplings. If requested, test data of production samples to support the certification shall be provided.

POLES

New poles shall be galvanized steel. Galvanizing shall be in accordance with AASHTO Specification M111 (ASTM A123). Steel pole material shall be in accordance with ASTM A36, A242, A570, A572, A607 or A595 Grade A or B. A595 material shall be limited to a 3/8 inch maximum thickness. Steel pole material with a thickness of 1/2 inch to 2 inches, shall satisfy Charpy V-Notch toughness test requirements of 15 ft. lb. at 40 degrees F. The SDDOT Office of Bridge Design shall be contacted for Charpy impact requirements for steel pole material thickness greater than 2 inches.

The steel pole-to-base-plate connection shall be a full-penetration groove-welded connection with a backing ring as described in Table 11-2, Detail 11, Example 5 of the current edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.

Cantilever traffic signal supports, including anchor bolts, shall be designed for fatigue in accordance with Fatigue Importance Category III without galloping and truck induced gusts.

Signal poles shall have rotatable mast arms.

Luminaire extension(s) shall have a 40 Ft. mounting height with 8 Ft. arm.

All poles shall have transformer bases.

LIGHTNING PROTECTION

All luminaire poles and service cabinets shall be equipped with industrial lightning arrestors compliant with current NEMA and UL Standards for lightning arrestors. Cost for ground rods and lightning arrestors shall be incidental to the contract unit price for the corresponding luminaire pole and service cabinet bid item.

TRAFFIC SIGNAL CONTROLLER

The Contractor shall provide the following traffic signal controllers:

- A quantity of two (2) Eagle EPAC M52 controllers, fiber-optic modem card, per specifications or approved equal.
- A quantity of one (1) Eagle EPAC M52 controller, fiber-optic modem card, per specification, with ECOM EPAC and ECOM MARC both loaded on the controller enabling ECOM 1+2 in the Boot Manager or approved equal.

The controller units shall be system compatible with the Closed-Loop System(s) that the City of Sioux Falls is currently utilizing. The controller unit shall be provided with an internal fiber optic modem, unless otherwise specified in the bid document, and manufacturer's "D" Cable. The Controller shall have a minimum of 16MHZ processor, TS 2 hardware and software, and a SDLC communications port device. The controller unit shall be the latest software revision M52 Series, or preapproved device capable of operation in a TS-1 and/or a TS2 facility installation.

The controller shall be two through twelve phase controllers.

Vehicle detectors for stop bar detection shall operate in the presence (non-locking) mode and shall have call delay timing capability. The call delay feature shall be inhibited by the controller. Set these detectors to 3 seconds delay.

Vehicle detectors S1-S6 on mainline Cliff Avenue shall operate in the passage (locking) mode

The controller cabinet doors shall be hinged on the right side.

Digital timing shall be provided with a battery backup.

The controller shall alternate the red and yellow indication when flashing.

The interface panels shall be capable of inserting up to sixteen load switches.

The controller cabinets shall be pad mounted.

The controllers shall be capable of programming by manual entry via the front panel keyboard, data downloading from a portable PC computer via null-modem cable, and data downloading from one controller to another using a serial port on each controller.

The controllers shall be capable of operating coordinated by time-based, hardwire, and telemetry.

The controller cabinets shall be capable of placing vehicle and pedestrian calls into the controller. Placed calls shall provide for eight vehicle phases and four pedestrian phases. The placed calls for vehicle phases shall be capable of extending the associated vehicle phase by continuous or intermittent contact.

The controllers shall have a copy function to copy all timing data from one phase to another. The controllers shall also permit copying all coordination pattern data from one pattern to another.

A Malfunction Management Unit shall be installed in each cabinet and shall conform to the requirements of NEMA Standard TS-2 Section 4.

A sufficient quantity of BUS Interface Units shall be installed in the cabinet to provide communication between detectors, load switches, controller unit, etc. Each BUS Interface Unit shall conform to NEMA Standard TS-2, Section 8.

The controller shall have internal signal dimming.

The controller Solid State Flasher shall have dimming capability.

The Contractor is responsible for programming controllers with the signal timings provided in these plans.

The Contractor shall install the controller cabinet and construct the cabinet footing according to standard detail Plate Numbers 635.17 and 635.19. All costs for constructing the concrete pad and footing, materials, labor, and furnishing and installing the controller cabinet shall be incidental to the contract unit price per each for "Traffic Signal Controller".

SIGNAL BACKPLATES

Signal backplates shall extend not less than 5 inches at the top, bottom, and sides. The bottom of the backplate on vehicle signal faces mounted directly above pedestrian signal indications shall be sized to permit the separate adjustment of the vehicle and pedestrian signal indication and may be less than 4 inches. All backplates shall have a dull black finish.

Signal backplates for 3-section heads shall be polycarbonate. Signal backplates for 5-section heads shall be fabricated from aluminum and shall be louvered.

FIBER OPTIC SYSTEM

Specifications for furnishing, installing, and testing the materials and equipment necessary for the construction of the fiber optic system can be found in the City of Sioux Falls Supplemental Standard Specifications.

FIBER OPTIC CABLE MODEM

New controllers shall be equipped with a fiber optic modem. Contractor shall furnish and install a fiber optic modem in existing controller at Benson Rd.

All costs for furnishing and installing fiber optic modems in new controllers shall be incidental to the contract unit price per each for "Traffic Signal Controller".



SIGNAL LAYOUT

CLIFF AVE AT BENSON ROAD

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 2115(45)87	G3	G7

TRAFFIC

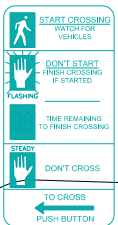
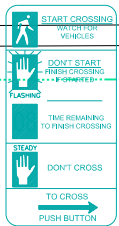
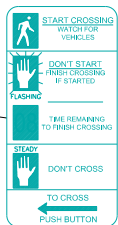
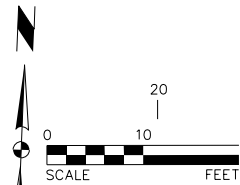
SIGNAL POLES

S3 - STA 100+59.8-70.1' LT
NEW SIGNAL POLE W/ 55' MAST ARM

PB1 - STA 100+67.6-61.8' LT
NEW PEDESTRIAN PUSHBUTTON POLE

PB2 - STA 100+70.6-59.9' LT
NEW PEDESTRIAN PUSHBUTTON POLE

NOTE: CONTRACTOR TO USE EXISTING WIRE IN SIGNAL POLES FOR EMERGENCY VEHICLE PREEMPTION AND CONFIRMATION LIGHTS.



LEGEND

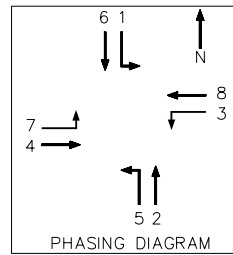
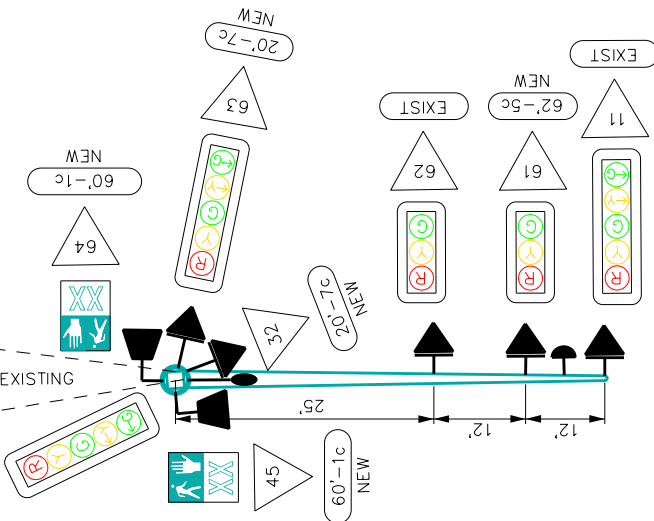
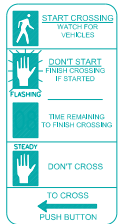
- LUMINAIRE
- EMERGENCY PREEMPTION
- SP1 SIGNAL POLE AND IDENTIFYING NUMBER
- TRAFFIC SIGNAL HEAD AND IDENTIFYING NUMBER (12" LENSES)
FIRST NUMBER (2)=PHASE NUMBER
SECOND NUMBER (1)=HEAD NUMBER
- 1 SECTION HAND/MAN PEDESTRIAN HEAD W/ COUNTDOWN TIMER AND IDENTIFYING NUMBER
FIRST NUMBER (2)=PHASE NUMBER
SECOND NUMBER (3)=HEAD NUMBER

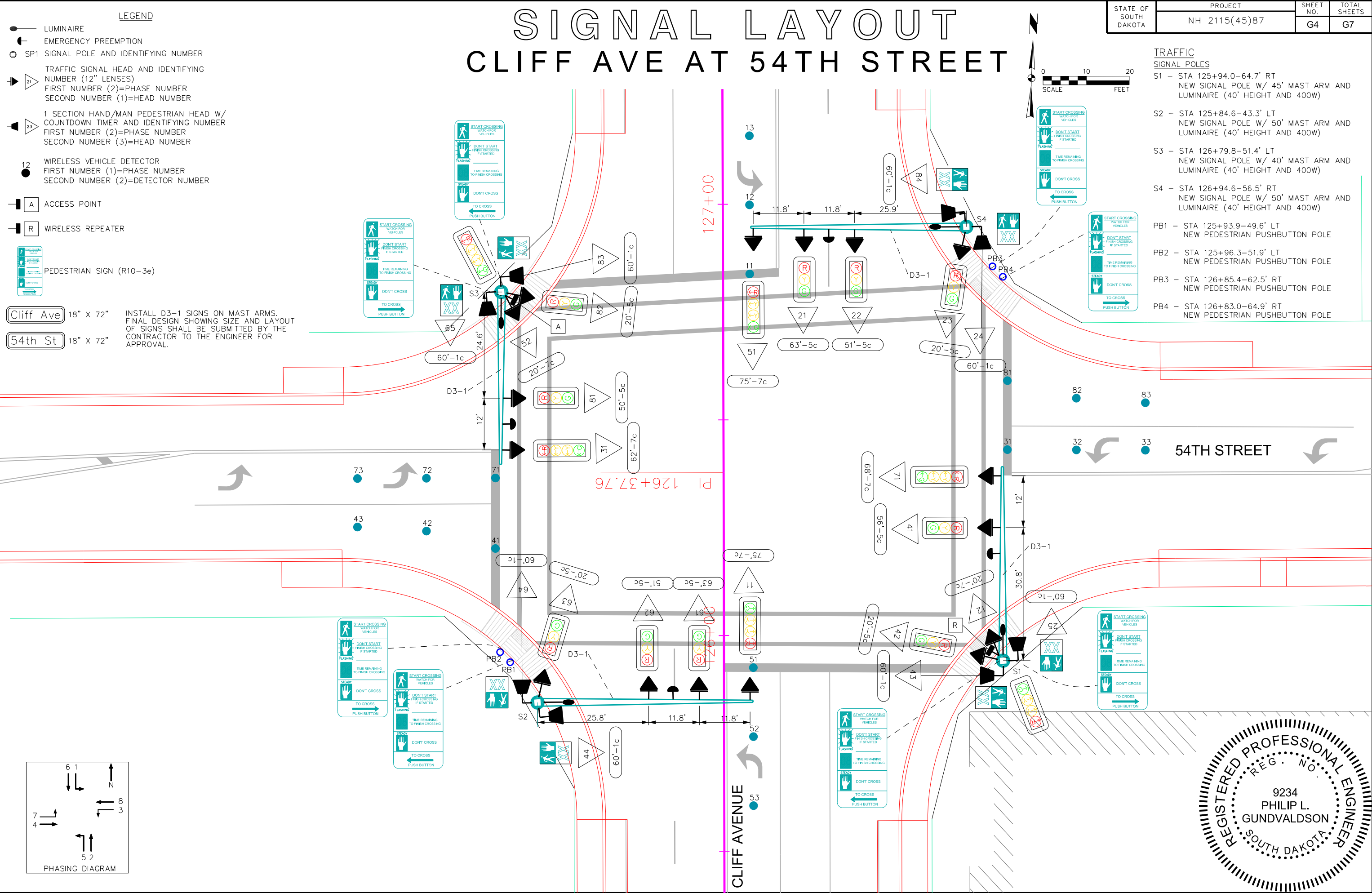
63'-4c
NEW
CABLE FOOTAGE AND TYPE
(NEW) = FURNISH & INSTALL NEW CABLE
(EXIST) = USE EXISTING CABLE

22
PREFORMED DETECTOR LOOP
FIRST NUMBER (1)=PHASE NUMBER
SECOND NUMBER (2)=DETECTOR NUMBER



Cliff Ave
Benson Rd
REMOVE AND RE-INSTALL D3-1 SIGNS ON MAST ARMS.





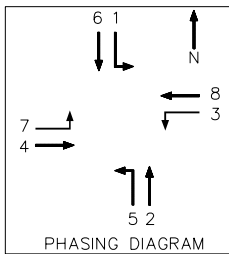
PlotDwrt: pdf_color_SDDot.plt.dgn
Model: Default
PenTht: hrg.tbl
Last Saved: 1/5/2012

- LEGEND**
- LUMINAIRE
 - EMERGENCY PREEMPTION
 - SP1 SIGNAL POLE AND IDENTIFYING NUMBER
 - TRAFFIC SIGNAL HEAD AND IDENTIFYING NUMBER (12" LENSES)
FIRST NUMBER (2)=PHASE NUMBER
SECOND NUMBER (1)=HEAD NUMBER
 - 1 SECTION HAND/MAN PEDESTRIAN HEAD W/ COUNTDOWN TIMER AND IDENTIFYING NUMBER
FIRST NUMBER (2)=PHASE NUMBER
SECOND NUMBER (3)=HEAD NUMBER
 - WIRELESS VEHICLE DETECTOR
FIRST NUMBER (1)=PHASE NUMBER
SECOND NUMBER (2)=DETECTOR NUMBER
 - ACCESS POINT
 - WIRELESS REPEATER
 - PEDESTRIAN SIGN (R10-3e)

Cliff Ave 18" x 72"
60th St 18" x 72"
INSTALL D3-1 SIGNS ON MAST ARMS.
FINAL DESIGN SHOWING SIZE AND LAYOUT
OF SIGNS SHALL BE SUBMITTED BY THE
CONTRACTOR TO THE ENGINEER FOR
APPROVAL.

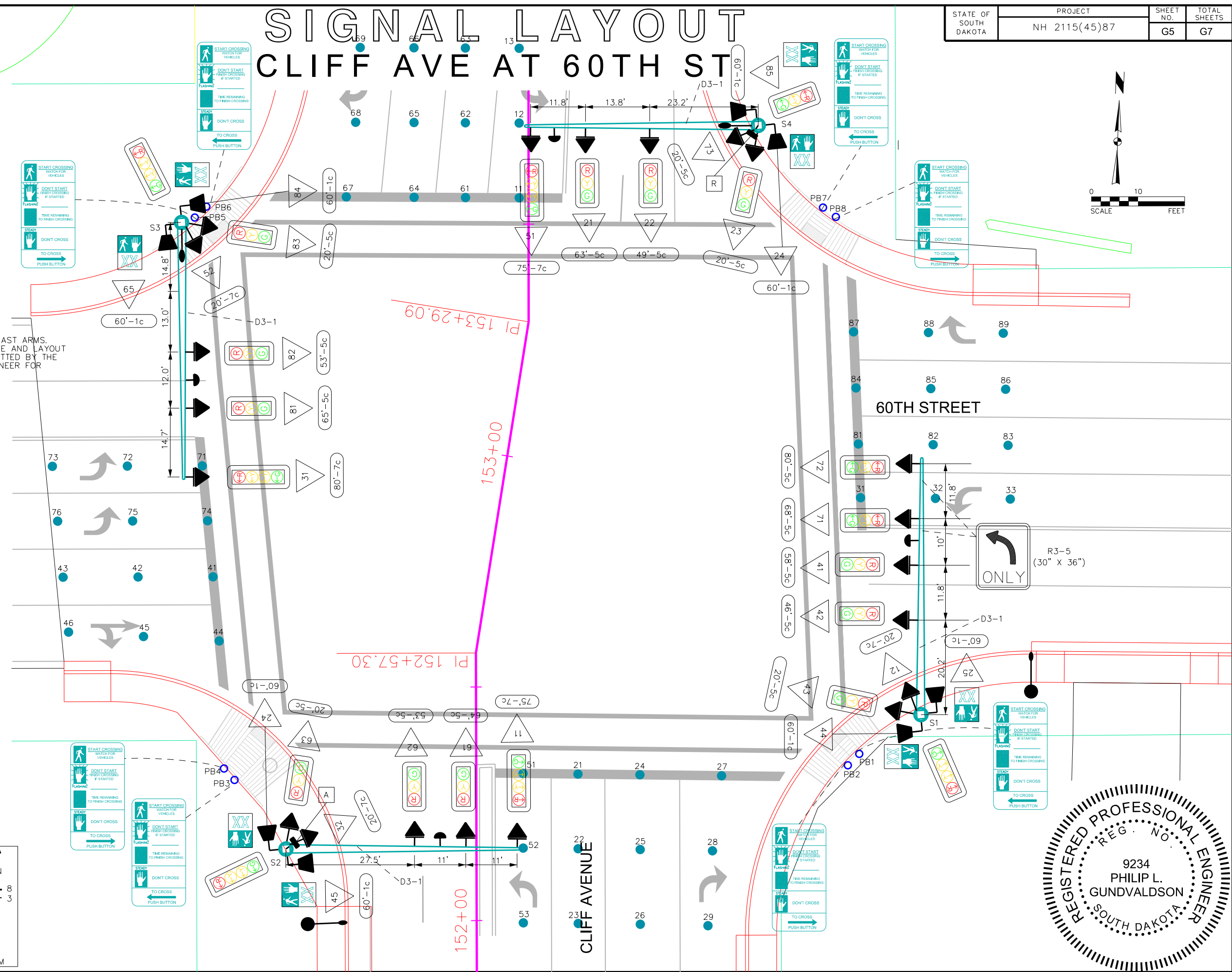
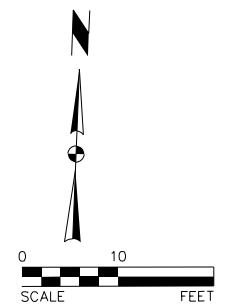
**TRAFFIC
SIGNAL POLES**

- S1 - STA 152+43.8-95.2' RT
NEW SIGNAL POLE W/ 55' MAST ARM
- S2 - STA 152+15.4-40.8' LT
NEW SIGNAL POLE W/ 50' MAST ARM
- S3 - STA 153+50.4-74.3' LT
NEW SIGNAL POLE W/ 55' MAST ARM AND
LUMINAIRE (40' HEIGHT AND 400W)
- S4 - STA 153+71.1-49.2' RT
NEW SIGNAL POLE W/ 50' MAST ARM AND
LUMINAIRE (40' HEIGHT AND 400W)
- PB1 - STA 152+35.5-82.0' RT
NEW PEDESTRIAN PUSHBUTTON POLE
- PB2 - STA 152+33.0-79.5' RT
NEW PEDESTRIAN PUSHBUTTON POLE
- PB3 - STA 152+30.2-51.7' LT
NEW PEDESTRIAN PUSHBUTTON POLE
- PB4 - STA 152+32.7-54.0' LT
NEW PEDESTRIAN PUSHBUTTON POLE
- PB5 - STA 153+51.5-71.4' LT
NEW PEDESTRIAN PUSHBUTTON POLE
- PB6 - STA 153+53.8-69.0' LT
NEW PEDESTRIAN PUSHBUTTON POLE
- PB7 - STA 153+53.5-63.0' RT
NEW PEDESTRIAN PUSHBUTTON POLE
- PB8 - STA 153+51.5-65.8' RT
NEW PEDESTRIAN PUSHBUTTON POLE

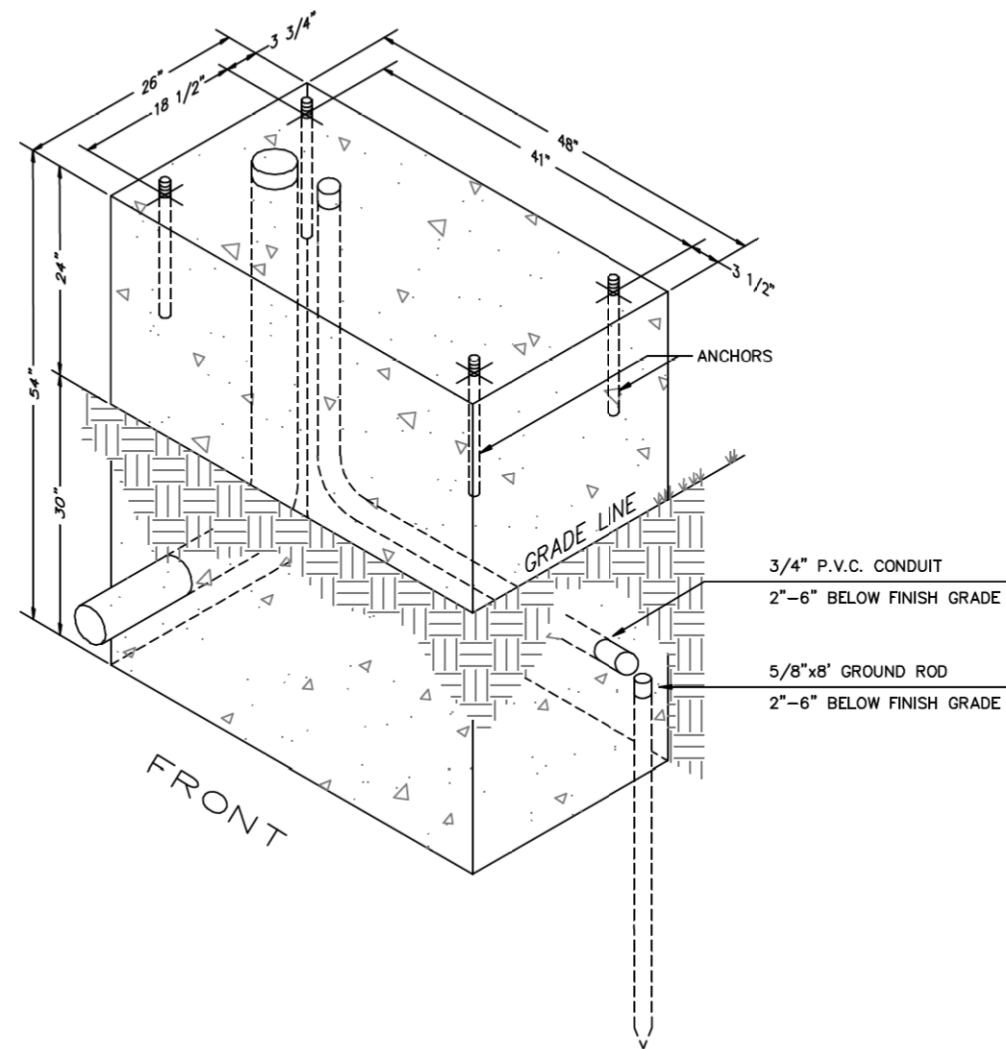


SIGNAL LAYOUT CLIFF AVE AT 60TH ST

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 2115(45)87	G5	G7



PlotDwg: pdf_color_SDDot.plt.dwg
Model: Default
PenPlot: hrg.tbl
Last Saved: 1/5/2012



- GENERAL NOTES:**
1. 5/8" DIA. x 18" GALVANIZED ANCHORS SHALL BE 2" ABOVE FINISHED CONCRETE.
 2. CONDUITS SHALL BE 2" TO 3" ABOVE FINISHED CONCRETE.
 3. CONDUIT TO BE RIGID STEEL AND HAVE THREADS SO THE GROUNDING BUSHINGS CAN BE INSTALLED.
 4. CONCRETE SHALL BE LEVEL AND STEEL TROWEL FINISHED.
 5. 5/8"x8' GROUND ROD SHALL BE INSTALLED 2"-6" BELOW FINISHED GRADE.
 6. 3/4" P.V.C. CONDUIT SHALL END ADJACENT TO THE GROUND ROD.

REVISED: AUGUST 2008

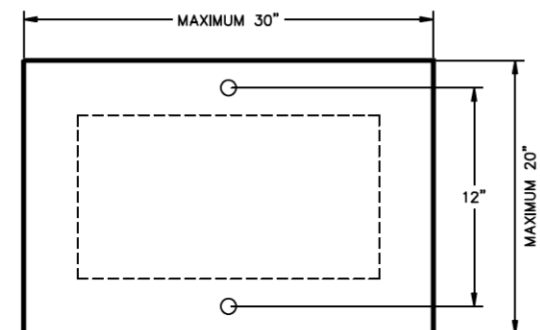
SPECIFICATION
REFERENCE
NO.
635A



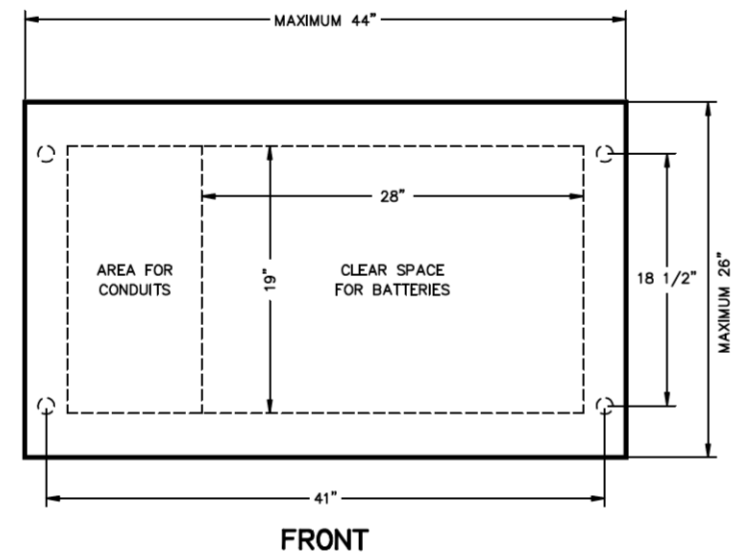
CITY OF SIOUX FALLS
ENGINEERING DIVISION
**CONTROLLER CABINET FOOTING
FOR EIGHT PHASE SIGNAL**

PLATE
NUMBER
635.17

TOP VIEW FOUR-PHASE CONTROLLER CABINETS:



TOP VIEW EIGHT-PHASE CONTROLLER CABINETS:



REVISED: JANUARY 2008

SPECIFICATION
REFERENCE
NO.
635A



CITY OF SIOUX FALLS
ENGINEERING DIVISION
**TRAFFIC SIGNAL CONTROLLER CABINET
SIZE AND BOLT HOLE REQUIREMENTS**

PLATE
NUMBER
635.19

